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APRIL 5.

Rev. HENRY C. McCOOK, D. D. in the chair.

Forty-four persons present.

Papers under the following titles were presented for publication:—

"The Terrestrial Mollusca inhabiting the Samoa or Navigator Islands." By Andrew Garrett.

"Notes on Fresh-water Rhizopods of Swatow, China." By Adele M. Fielde.

Note on the Multiplication of Distoma.—A note was read from MISS ADELE M. FIELDE, dated Swatow, China, Feb., 1887, to the effect that *Distoma* infests a species of snail found in many of the pools and wells near Swatow which is eaten, boiled, by the Chinese, and which is fed raw to ducks and geese. On dissecting, recently, an apparently healthy specimen, having a shell an inch long, she had found its liver almost wholly replaced by a *Redia,* the parent of the *Cercaria,* which being passively transferred to the alimentary canal of a vertebrate, develops into the *Distoma.* The life history of this trematode, as worked out by A. P. Thomas, is given in the Quarterly Journal of Microscopical Science, 1883, pp. 99–133, and *Limnæus* is mentioned as its host.

The *Rediæ* seen in the snails were of an orange yellow color and the largest were one-tenth of an inch in length. There were counted two hundred and fifty-three that were large enough to be easily isolated by the use of a needle point under the naked eye; and scores more, of smaller size and paler yellow, were visible under a lens. On opening several of the larger *Rediæ,* whose muscular mouths were active; they were found each to contain from eighteen to twenty-six *Cercariæ,* strong enough to whirl their tails vigorously, beside many embryos less fully developed. The *Cercariæ* moved rapidly over a glass slide by the use of their two suckers; and, merged in water, retained their vitality for thirty hours after being removed from the snail and the *Redia.* The one snail must have been the host of at least ten thousand larval Distomas.

APRIL 12.

Mr. CHARLES P. PEROT in the chair.

Thirty-one persons present.

The Placentation of the Two-toed Ant-eater, Cycloturus didactylus.—Prof. J. A. RYDER remarked that some months since Mr. J. W.

Scollick kindly placed in his hands an example of the uterus, containing a perfect fœtus of this interesting little arboreal South American Ant-eater. The only description of the fœtus and membranes of this animal which the speaker had been able to find, was by Mayer, in his *Analecta*, while Milne-Edwards has figured and described the fœtus and membranes of the allied form, *Tamandua*, in the "Annales des Sciences Naturelles."

The almost globular uterus, containing a well-developed fœtus, in the specimen exhibited at the meeting of the Academy, was about one inch in diameter. The placenta was relatively large, dome-shaped, or in the form of a disk, seven-eighths of an inch in diameter, much thickened in the center and becoming abruptly thin at its margin. Its outer or maternal surface was very convex and its inner or fœtal surface distinctly concave. The rather short, stout umbilical cord was attached at about the center of the disk and to its inner surface. The placental disk when carefully inspected upon its inner surface was found to be distinctly lobulated, somewhat as in the Sloths, as described by Sir Wm. Turner. The fissures which divided the placental disk were especially conspicuous when the edges of the disk were slightly bent by the fingers towards the convex side.

The uterine cornua were short, and the uterus was simple as in man and the sloths; the oviducts apparently quite small; the ovaries of strikingly unequal dimensions on opposite sides. No portion of the uterus was exserted or projected into the vagina as in man, but the walls of the vagina passed directly into those of the uterus. The vaginal mucous membrane was, however, deeply plicated in a longitudinal direction, these plications extending slightly into the cavity of the uterus.

The vessels of the cord are subdivided at their insertion into the placental disk ; arterial and venous branches going to and from the several placental lobes, of which there were five, which could be distinctly made out.

On the inner surface of the uterine walls, there were apparently adherent portions of the fœtal and maternal tissues of the placenta, showing that this type is in all probability more or less deciduate, notwithstanding the fact that the uterine walls are relatively quite thin. The area embraced by the true chorion or placenta covered very nearly one-half of the inner surface of the globularly distended uterus. The false chorion made up the other half of the membranous investment of the fœtus and was quite thin and translucent. It covered with its outer surface about half of the inside of the uterus, or that hemisphere of the latter at the pole of which the vagina opened from without. The fœtus itself was well advanced, having as yet no outward hairy coat, nor could any traces of hair follicles be noted in the skin. No epitrichium was observed, though this may be developed at a later period, or after the hair is erupted from the follicles. The total length of the fœtus was nearly or quite three inches, of which the long stout tail formed more than a third.

The speaker then contrasted the various types of placentation, pointing out that it was largely a matter of how the blastodermic vesicle was primarily brought into relation with the walls of the uterus. If the fœtation occurred in the bicorned or tubular type of uterus there was an obvious tendency toward the diffuse or zonary type of placenta, as shown in Ungulates and Carnivora, and in those uniparous forms in which the fœtus occupies mainly one horn of the uterus, and in which there are bare poles to the chorion and a bare spot where the latter comes in contact with the os uterus as in the Mare and Dugong. Here, the mere mechanical relations of the fœtal and maternal surfaces obviously had had an influence in determining the form of the placenta. The zonary placenta was also imitated in Arthropods (*Peripatus*) in virtue of the existence of such similar conditions in both the latter and Carnivorous Mammalia. The speaker thought that all attempts to use the placenta as a means of clearly distinguishing the various orders of mammalia or of subdividing the latter into sub-classes would, in the course of further embryological research, be shown to be not well founded. This seemed all the more probable since the rationalé of the so-called "inversion" of the germinal rays of Rodentia was better understood. As a result of fuller knowledge it is hardly conceivable that a zonary placenta could be found in those types, notwithstanding the fact that they at first seem to present the same type of condition for the blastodermic vesicle in the uterine cornua as do the Carnivora. But now that we know that some of the Insectivora (*Talpa*) tend in the same direction the anomalies which are presented by Insectivora and Rodentia become explainable and lead us up to the view that, it depends (1) upon the mode in which the early development is modified, and (2) upon the manner in which the fœtus is related to the maternal surfaces, whether the diffuse, zonary or discoidal form of placenta will be assumed.

In the case of the Sloths and Ant-eaters, of South America, the uterus has attained a remarkable degree of specialization, so as to greatly resemble the simple uterus of the higher Primates, and in this case again, the relationship between the form of the uterine cavity and that of the placenta seems obvious, for in the sloths, ant-eaters and higher primates, the placenta is essentially discoidal and deciduate. In the sloth, however, Turner has shown the discoidal placenta to be made up of separable lobes; these may be conceived as representing the cotyledons of Ungulates, or groups of tufts in the diffuse type of placenta, which have been crowded together as the uterine cornua became shortened on the mesometric side, in the transition from the bifid to the simple type of uterus. Some further ground for this view of the origin of the lobulated discoidal, dome-shaped placenta of the sloths is supplied by the fact that in *Manis*, or the scaly Ant-eater of the Old World, the placenta is diffuse and non-deciduate. In some of the Armadilloes the placenta is transversely oblong, and this again is a fact favorable to the preceding view.

In like manner, the terms "deciduate" and "non-deciduate" do not serve to sharply mark off groups from each other, but probably rest for their distinction upon the more or less intimate and complex interlocking of the fœtal and maternal membranes during their functional activity. So that in this case again we are dealing with structures and structural conditions differing only in degree but not in kind. The extra thickening of the decidua or uterine mucosa in the extremest type of deciduate placenta, may be regarded as correlated with the restriction, concentration or reduction of the placental area and the formation of a decidua serotina. Finally, it is proper to call attention to the fact that the American Edentata are more specialized as respects their placentation than those of the Old World. The American forms, further, generally agree amongst themselves, except that in the Armadilloes, Milne-Edwards, Kölliker and Von Jhering have observed that, in some species, there may be a number of fœtuses invested by a common chorion, on which account, the latter author has supposed that such a compound embryo is the result of the fragmentation or subdivision of a single egg, a phenomenon of metagenesis to which he has applied the appropriate term *Temnogeny.*

Sugar in China.—At the recent meeting of the Botanical Section, Mr. THOMAS MEEHAN read the following extract from a letter of Miss Adele M. Fielde, a missionary in China. The letter is dated from Swatow. "My attention has lately been called to an error, existing apparently in many minds, concerning the plant from which sugar is made in China. A late consular report from Canton says the plant is a species of Sorghum, and in the American Cyclopædia (Appleton, 1863), the article on Sorghum appears to me to convey the same idea. I send you to-day flowers of the plant cultivated very extensively for the sugar in the neighborhood of Swatow, and which is the source of the chief export of this treaty port. It seems to me no sorghum, but by the description in botanical works, the true *Saccharum officinarum.* Tell me whether it differs from the plant from which sugar is made in the Southern United States. Propagation is from cuttings,—a section of the culm, a foot long, being set out at each planting. This planting is done in February, and is ready to be cut for pressing out the juice eleven months later. In the fourth year the stubble is removed, and new cane is planted. It is not allowed to flower, as the cultivators say it spoils it for use in sugar making." Mr. Meehan said he could scarcely understand how the idea should get currency that Sorghum yielded the sugar of China, for though the native country of the true sugar cane is unknown, the civilized world is indebted to China for the first knowledge that what we know as sugar could be extracted from the cane. Manufactured sugar from this cane was known in China before it was known in Europe. As for Sorghum, though sugar could be made from it, it had been found so unreliable for that purpose, depending apparently more on some chemical accident than on vital power, that it was doubtful if sugar in any quantity had ever been made from it in China or anywhere else. Certainly the specimens sent by Miss Fielde were of the true sugar cane, as grown by us in the Southern States.

Floral Calendars.—In regard to the times of flowering of plants, MR. MEEHAN exhibited blooms of the winter Aconite, *Eranthus hyemalis,* and the Snowdrop, *Galanthus nivalis,* which this year were blooming together on the 10th of April. In other seasons the same plants, growing side by side, had given flowers of the winter Aconite, several weeks before the Snowdrop. The explanation was that some plants would start into growth at a lower temperature than others. The Snowdrop would remain at rest under a low temperature quite sufficient to excite the Aconite. In a season when the thermometer remained regularly lower than sufficient to excite growth in the Aconite, the plant remained quiescent until the warmer spring weather brought forward both kinds together. These facts showed that no such a scheme as a floral calendar could be established, as the relative blooming of plants depended on accidents of temperature rather than on any fixed climatal conditions.

Cortical Peculiarities in the Plum.—Some specimens of supposed hybrids between the Peach and the Plum were sent to the Academy for examination. The chief reasons for the belief that they were hybrids were that they were sterile, and seemed in leaf and branches intermediate between the two species. MR. MEEHAN observed, that in hybrids between acknowledged species, it did not follow that the characters should be intermediate. Often there would be scarcely any trace of the action of the male parent, while at other times the male would seem to have had a leading influence. But these plum branches showed no trace of any intermediate characters, but were purely plum branches, with no sign of the Peach character about them.

He said he had called the attention of the Academy on several occasions in the past to the fact that the bark of trees did not crack from the mechanical pressure of wood-growth, as so often taught in botanical text-books, but the rifts arose from the peculiar growth of cork cells, and it was the character and general direction of these growths, apparently different in species, that gave the varied characters to tree bark,—characters that were more or less constant in each species of tree. A tree could in fact be nearly as well known by its bark as by its fruit. The development of the cork cells destroyed the cuticle. In the Cherry and Birch the chief development was in a lateral direction, and hence we could easily strip sections from around branches. In the Abele Poplar the development destroyed the bark to a considerable depth, and in a quadrangular form. These gradually met at the points and at once formed deep furrows up and down the stem. In the Plane and some other trees, the cork cells worked up and down under thick layers of bark which it threw off in flakes. But the chief distinction was in the period of life when they assumed activity. In the Chestnut (*Castanea*) it was nearly 25 years before they grew into destructive agencies, and hence there was smooth bark to the Chestnut for nearly a quarter of a century. In the oak rough bark from the development of the cork cells, began at about ten years, in the Sassafras at five years,—in some they started at one and occasionally the same season. In the Beech they grew the first season, and only worked under the outer cuticle, which they threw off as fine film annually. Handling a branch of Beech at some seasons, a filmy deposit would be left in the hands, which was the fine silky bark of the Beech. Hence the Beech had never rough bark. This fact should show mechanical action had no part in rifting the bark. Mechanical action should split a Beech as well as any other tree.

Returning to the Plum, he remarked that the development of the cork cells were in many respects the same as in the Beech. They started on their destructive errand before the annual growth was fairly over, destroying the thin outer cuticle as it progressed. It was this that gave the silvery tint to Plum wood with which all must be familiar. This was never seen on Peach wood. This character was exhibited in all the samples of supposed hybrids sent. There was nothing whatever to distinguish them from pure Plums so far as this character was concerned.

As for the flowers, the plants were sterile because of peculiar abortion in the reproductive organs. The carpels instead of being consolidated, ending in a single style as in the ordinary Plum, had become distinct, and they were ten processes' difficult to say whether they resembled stamens or pistils most. There were no attempts to form perfect stamens or petals,—but the bud scales had a faint rosy margin as if there existed a slight disposition to make petals out of them. They were remarkable examples of monstrosity in Plum flowers, but nothing to indicate any action of the Peach therein. They were evidently sterile because they were monstrous, and not that they were hybrids. The foliage had a more peachy look than customary with Plums, so far as mere outline was concerned,—but it is well known that when there was a disturbance of sexual characters, the whole system of growth was apt to be disturbed. It was possible the Plum and the Peach would hybridize. It would be of much interest to science could the possibility be proved a fact. It was due to science to say these specimens did not prove it. The chief interest in the specimens, he thought, dwelt in the fact that amidst all the changes in characters brought about by some abnormal agency, the cortical peculiarities as influenced by the cork cells remained the same.

APRIL 19.

The President, DR. LEIDY, in the chair.

Fifteen persons present.